# EE 300 Syllabus

## Course Information

<table>
<thead>
<tr>
<th>Year</th>
<th>2003-2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester</td>
<td>2</td>
</tr>
<tr>
<td>Course Title</td>
<td>Signals and Linear Systems</td>
</tr>
<tr>
<td>Course Number</td>
<td>EE 300</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>• Electrical Circuits &amp; Differential Equations</td>
</tr>
<tr>
<td>Course Website</td>
<td><a href="http://www.just.edu.jo/~hazem-ot/ee300_main.html">http://www.just.edu.jo/~hazem-ot/ee300_main.html</a></td>
</tr>
<tr>
<td>Instructor</td>
<td>Dr. Hazem Al-Otum</td>
</tr>
<tr>
<td>Office Location</td>
<td>E1L2 14</td>
</tr>
<tr>
<td>Office Phone</td>
<td>7201000 Ext. 22559</td>
</tr>
<tr>
<td>Office Hours</td>
<td></td>
</tr>
<tr>
<td>E-mail</td>
<td><a href="mailto:Hazem-ot@just.edu.jo">Hazem-ot@just.edu.jo</a></td>
</tr>
<tr>
<td>Teaching Assistant</td>
<td>None</td>
</tr>
</tbody>
</table>

## Text Book

<table>
<thead>
<tr>
<th>Title</th>
<th>Signals, systems and transforms</th>
</tr>
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<tbody>
<tr>
<td>Author(s)²</td>
<td>Charles L. Phillips, John M. Parr and Eve A. Riskin</td>
</tr>
<tr>
<td>Publisher</td>
<td>Prentice Hall</td>
</tr>
<tr>
<td>Edition &amp; Year</td>
<td>3rd - 2003</td>
</tr>
<tr>
<td>Book Website</td>
<td><a href="http://vig.prenhall.com/catalog/academic/product/0.4096.0130412074.00.html">http://vig.prenhall.com/catalog/academic/product/0.4096.0130412074.00.html</a></td>
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</table>

### References


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¹ Here you find tutorials, demos, and sample exam questions designed by the course instructor
² See [http://www.ee.washington.edu/class/SST_textbook/textbook.html](http://www.ee.washington.edu/class/SST_textbook/textbook.html) for notes, examples and demos designed by the book authors
### Assessment Policy

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Expected Date</th>
<th>Weight</th>
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<tbody>
<tr>
<td>First &amp; second Midterm Exams</td>
<td></td>
<td>50%</td>
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<td>Activity</td>
<td>see the instructor website</td>
<td>10%</td>
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<td>Final Exam</td>
<td>TBD</td>
<td>40%</td>
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<td>Other Assessment</td>
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<td>Bonus</td>
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### Course Objectives

In this course, the student will attain theoretic and algorithmic principles required to:

- develop an overview of signals and linear systems concepts: properties, types and classification into continuous- and discrete-time.
- comprehend Fourier Transform, Fourier Series, and Laplace Transform: their its properties, and applications in various systems in continuous-time systems. The same thing is true for the Z-transform and discrete Fourier Transform.
- To gain experience in applying taught concepts to real systems (using the MATLAB signal processing toolbox).

### Teaching & Learning Methods

- Class lectures, lecture notes, assignments, and tutorials are designed to achieve the course objectives.
- You should read the material covered in class, complete assignments on time, participate in class discussions, and do whatever it takes for you to grasp the topics.
- You are responsible for all material covered in the class.
- Please communicate any concerns or issues as soon as possible either in class, or by E-mail.
- The web page is a primary communication vehicle. It will contain homework assignments, study guides, and important instructions.

### Learning Outcomes

Upon completion of this course, the student will have the ability to:

- Demonstrate understanding of basic signal and system concepts and implementations.
- Perform continuous- as well as discrete-time transforms in various applications.
- Demonstrate understanding of state variable formulations in multi-input multi-output systems.
- Simulating the various concepts using the signal toolbox and simulink supported by MATLAB.
<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Chapter in Text</th>
</tr>
</thead>
</table>
| 1    | • Course Introduction  
|      | • Introduction to Signals and Systems  
|      | 1 |
| 2, 3 & 4 | **Continuous-Time Signals and Systems.**  
|            | Properties of Continuous-Time Systems.  
|            | Impulse Representation of Continuous-Time Signals.  
|            | Convolution for Continuous-Time LTI Systems.  
|      | 2 & 3 |
| 5, 6, 7 & 8 | **Fourier Series and Transform**  
|            | System Analysis. Fourier Transform.  
|            | Energy and Power Density Spectra. **Applications.**  
|      | 4, 5 & 6 |
| 9 & 10 | **The Laplace Transform**  
|            | Laplace Transforms. Laplace Transform of Functions.  
|      | 7 |
| 11 & 12 | **Discrete-Time Signals and Systems.**  
|            | Common Discrete-Time Signals.  
|            | Applications of the Discrete Fourier Transform.  
|      | 9 & 10, 12 |
| 13, 14 & 15 | **The z-Transform**  
|      | 11 |
| 16 | **Advanced Topics** | — |
### Notes

| Assignments          | • Late assignments will not be accepted. Failure of your computer is not an excuse for not submitting your assignment on time.  
|                      | • Submit a hard copy of your homework with your name, Section#, Sequence #, SID, and Homework # on it.  
|                      | • All homework assignments are to be done individually.  
|                      | • Students handing in similar work will both receive a 0 and face possible disciplinary actions  
| Exams                | • The format for the exams is generally (but NOT always) as follows: general definitions, Multiple-choice, writing algorithms, analyzing algorithms, and short essay questions.  
|                      | • To make sure you pass the exams, you should do the assignments by yourself.  
| Makeup Exams         | • Makeup exam should not be given unless there is a valid excuse according to JUST policies.  
|                      | • Arrangements to take an exam at a time other than the one scheduled MUST be made prior to the scheduled exam time (at least 2 weeks).  
| Drop Date            | • Last day to drop the course is 13/5/2004.  
| Cheating             | • Cheating or copying from neighbor on exam, quiz, or homework is an illegal and unethical activity.  
|                      | • Standard JUST policy will be applied.  
| Workload             | • Average work-load student should expect to spend is 12 hours/week  
| Graded Exams         | • Instructor should return exam papers graded to students by the end of the week following the exam date  
| Participation        | • Participation in, and contribution to class discussions will affect your final grade positively. Raise your hand if you have any question.  
|                      | • Making any kind of disruption and (side talks) in the class will affect you negatively.  
| Free Lab             | • There is a free lab, in which you can have access to the Internet and work on your assignments.  
| Attendance           | • Excellent attendance is expected.  
|                      | • JUST policy requires the faculty member to assign ZERO grade (35) if a student misses 10% of the classes without a valid excuse.  
|                      | • Sign-in sheets will be circulated.  
|                      | • If you miss a class, it is your responsibility to find out about any announcements or assignments you may have missed.  

1. The Fourier transform of \( u(t) \) is \( B(j\omega) \) and the Laplace transform of \( u(t) \) is \( A(s) \). Which of the following is correct? 
   a) \( B(j\omega) = A(s) \) 
   b) \( A(s) = \frac{1}{s} \) but \( B(j\omega) \neq \frac{1}{j\omega} \) 
   c) \( A(s) \neq \frac{1}{s} \) but \( B(j\omega) \neq \frac{1}{j\omega} \) 
   d) \( A(s) \neq \frac{1}{s} \) but \( B(j\omega) = \frac{1}{j\omega} \) 

3. The input and output of an LTI system are \( x(t) = e^{-3t}u(t) \) and \( y(t) = e^{-t}u(t) \). The differential equation which characterizes the system is 
   a) \( \frac{dy(t)}{dt} + y(t) = \frac{dx(t)}{dt} + 3x(t) \) 
   b) \( \frac{dy(t)}{dt} + 2y(t) = \frac{dx(t)}{dt} + 3x(t) \) 
   c) \( \frac{dy(t)}{dt} - y(t) = \frac{dx(t)}{dt} + 3x(t) \) 
   d) \( \frac{dy(t)}{dt} - 2y(t) = \frac{dx(t)}{dt} + 3x(t) \)